Failure to thrive

Failure to think about failure to thrive

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Perspective on the paper by Olsen *et al* (***see page 109***)

Failure to thrive (FTT) or weight faltering has been regarded as an important problem in infancy[1] associated with a range of paediatric conditions from coeliac disease[2] to sudden infant death syndrome.[3] Growth monitoring, perhaps the most common child surveillance activity,[4] aims, among other things, to identify faltering growth,[5] and generates frequent paediatric referrals.[6] However, as Olsen *et al*[7] show, the definition of FTT is open to dispute, raising questions about the value of the weight component of growth monitoring and the continued place of weight faltering as a useful marker of disease and impaired infant development.

WHAT IS FTT?

Despite its established place in the paediatric literature (a Medline search limited to all infants and humans only with ''failure to thrive'' as the keyword yields >2000 references), there is no consensus on its precise definition. Undernutrition is thought to underlie FTT,[8] and a recent review of articles published between January 2003 and June 2004 and recent textbooks reported that solely anthropometric parameters are now universally used in its identification.[9] However, there was no agreement on which growth parameters to use and whether to use attained values or velocities.[9] Thus, it seems that static definitions of low attained weight continue to be used despite longstanding recognition of their limitations.[10 11]

Dynamic definitions that assess weight velocity and change over time are now regarded by most researchers as preferable to attained values. However, there is limited consensus as to which dynamic definitions to use. The most frequently used in practice are those in which FTT is defined as a fall through centile lines. For example, O'Brien *et al*[12] defined FTT as weight falling through two major centile lines on standard weight charts or falling below the 2nd centile. Others have argued that these simple definitions based on poor weight velocity are problematic, as they fail to take account of regression to the mean.[13–15] Still others have argued that regression to the mean is likely to be negligible over short time periods.[16] Raynor and Rudolf[17] compared the values of five anthropometric methods of classifying FTT—namely, median weight for age (Gomez); median weight for height (Waterlow); median weight/median height for age (McLaren/Read); body mass index (BMI); thrive index: later weight (standard deviation (SD))−(birth weight SD× 0.4)—as markers of severity and predictors of developmental, dietary and eating problems. They found that the methods were inconsistent in classifying severity and no one method was superior in predicting problems. They concluded that weight alone, being the simplest, remains the most reasonable marker of FTT and associated problems. Olsen *et al*[7] also concluded that concurrence between different anthropometric methods of classifying FTT is low, but they argued that no single measure alone was adequate for identifying weight faltering in the general population.

In short, despite the development of more sophisticated measures of weight faltering, a consensus on a practical definition remains elusive, and no single measure adequately identifies FTT in general infant populations or accurately predicts adverse developmental outcomes.

HOW IMPORTANT IS FTT?

Despite the problems of definition, FTT occupies an important place in paediatric practice, and huge resources are expended on its identification. Does the evidence for its importance warrant this level of activity? Research on the significance of FTT has been marred by two major methodological problems—problems of definition, as described above, and problems of referral or selection bias.[18] Many of the studies informing both clinical and preventive practice have been carried out on hospital populations that do not reflect the general child population.[19 20] Both these methodological problems tend to lead to overestimation of the clinical significance of FTT and its value as a predictor of future problems. Inadequate definition probably leads to labelling normal small or slow-growing children as failing to thrive, and the selection bias associated with hospital populations results in overidentification of FTT as a clinical problem, with consequent referral of normal children for investigation.[6]

Population-based studies have dispelled some of the misconceptions surrounding FTT. Exclusion of organic disease is a common reason for referral of children who are failing to thrive; however, <5% of children who fail to thrive have organic disease.[21] Failure to find an organic cause for FTT has led to the assumption that neglect must be responsible. This assumption, too, has been undermined by population-based studies that have found that only 5–10% of infants failing to thrive are entered on to child protection registers.[22 23] Although infants in abusing families are at greater risk of FTT, these infants form only a small proportion of all children with FTT.[22 24] Despite the widely held view, reproduced in my own book on poverty and child health,[25] that FTT is associated with poverty and deprivation, a community-based study in Newcastle, UK concluded that the role of deprivation and poverty has been overstated.[23] Data from the Avon Longitudinal Study of Parents and Children reported an association with parental height and large families but not with socioeconomic factors or maternal education.[26] Postnatal depression has been linked to FTT in population-based studies[12 27] but not in a study based on data from the Avon Longitudinal Study of Parents and Children.[28] In the Gateshead Study, the association with postnatal depression was found to be strong at 4 months but was not at 12 months.[29]

The significance of FTT as a predictor of future developmental and psychological problems has also been called into question. A meta-analysis of four studies included in a systematic review of cohort studies and randomised control trials, involving children identified as failing to thrive before age 2 years, with growth, development or behaviour measured at age ⩾3 years, showed a 3-point reduction in IQ in children who had earlier failed to thrive.[28] The authors question the clinical relevance of this difference. A meta-analysis with less-exacting inclusion criteria concluded that FTT in infancy is associated with adverse intellectual outcomes sufficient to be important at the population level.[30] A study of adolescents who had failed to thrive in infancy failed to show any evidence of emotional deficit in cases compared with controls.[31]

TO SCREEN OR NOT TO SCREEN?

Weight monitoring is one of the most common procedures undertaken in child health surveillance and in secondary

paediatric settings. A systematic review of weight monitoring found only two randomised or quasi-randomised trials, both in developing countries and neither showing conclusive evidence of the effectiveness of weight monitoring.[32] Although no evidence exists for its effectiveness as a screening procedure in developed countries, it has become a de facto screening procedure. Although no evidence of effectiveness is not evidence of ineffectiveness, there are very good grounds for questioning whole-population screening of weight to identify FTT among infants in developed countries. The absence of consensus on the definition of FTT, and the best method of identifying it, results in a lack of standardisation of the criteria used to decide whether an infant tests positive or negative in the screening. Evidence from above-mentioned studies suggests that the different anthropometric criteria currently in use would identify different screening-positive populations. Even by using a standardised definition, the sensitivity and specificity are probably too low to fulfil screening criteria. The current programme of weight monitoring is known to produce a large proportion of false-positive referrals, with associated anxiety and inappropriate use of limited clinic time.[6 24] Weight monitoring also does not adequately meet other screening criteria. As discussed above, FTT is of questionable prognostic value and, although infants who fail to thrive are at higher risk of abuse and organic disease, these form a small percentage of infants with FTT. The natural history also suggests that FTT in most of them will resolve with no intervention and no adverse consequences. Another problem is that, despite its apparent simplicity as a measure, consistent, standardised, accurate weight measurement is difficult to sustain in routine child health surveillance, and poor local standards can invalidate the programme.[33 34] It seems reasonable to conclude that, although it may have other potentially valuable functions,[24] weight monitoring is not a good screening test for FTT.

IMPLICATIONS FOR CHILD HEALTH PRACTICE

What are the implications of this discussion for future child health practice?

- Weight monitoring is firmly established among mothers and will not be readily discontinued in child health surveillance. However, it should not be regarded as a reliable screening test for FTT.
- Given the lack of consensus on the definition of FTT and the most appropriate anthropometric methods to identify it, child health practitioners in both primary and secondary care should avoid diagnostic conclusions based solely on anthropometry.
- Even with weight monitoring using simple anthropometric methods based on attained weight, it has proved difficult to ensure quality in routine practice—more complex methods based on weight velocity or conditional weight gain are likely to present greater quality assurance problems in routine settings.
- In the absence of additional clinical signs of abuse, organic disease or severe undernutrition, child health practitioners should be encouraged to adopt a ''wait-and-see'' approach for infants who are failing to thrive, and avoid inappropriate investigations and referrals.
- Infant feeding and thriving are highly emotive aspects of parenting, and child health practitioners should avoid, at all costs, generating unnecessary anxiety and guilt regarding infant weight gain. The search for FTT, as with other conditions, is not neutral and has the potential to do more harm than good.

Despite its established place in paediatrics and child healthcare, FTT is not a diagnosis and has no universally accepted definition. This does not mean that it should be ignored or abandoned entirely as a clinical concept, but its place in clinical practice needs to be fully informed by recognition of its limitations. Failure to think about FTT will inevitably lead to inappropriate clinical and preventive practice.

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